FINAL ENVIRONMENTAL ASSESSMENT CONSTRUCTION OF NEW CHILD DEVELOPMENT CENTER

AT

TINKER AIR FORCE BASE, OKLAHOMA

United States Air Force
Air Force Materiel Command
Tinker Air Force Base, Oklahoma

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FINDING OF NO SIGNIFICANT IMPACT:
CONSTRUCTION OF NEW CHILD DEVELOPMENT CENTER
TINKER AIR FORCE BASE

Pursuant to Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA; 40 Code of Federal Regulations [CFR] 1500 1508), Department of Defense (DoD) Directive 6050.1, and Air Force Regulation 32 CFR Part 989, the 72d Air Base Wing on Tinker Air Force Base (AFB) has prepared an Environmental Assessment (EA) that evaluates the potential environmental impacts associated with construction of a 31,667 square foot facility to service approximately 200 children.

PURPOSE AND NEED

The purpose and need of this action would be to provide quality, available and affordable childcare services at Tinker AFB. Tinker AFB is deficient in meeting only 60% of current childcare needs. There are currently 245 children on the wait list. The average wait time for on-base child care is 16 months. Sufficient childcare facilities are not available on Tinker AFB to meet workforce needs. Eligible families must use off-base child care facilities that are expensive and distant from the base. Tinker AFB military members and employees often work extended hours to support essential war-fighter requirements, and the lack of extended hours at these off-base facilities pose problems for parents who work those irregular hours. (EA Section 1.1, page 1-1)

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is to construct a new child development center on land previously developed and utilized as an Engine Can Yard in the South Forty District of the base. The location of the proposed action is adjacent to and within walking distance of Military Family Housing. A $14.6M Military Construction project had been programmed for execution in FY 2012; however, American Recovery and Reinvestment Act funds became available and this action is proposed for FY 2010. Under the proposed action a 31,667 square foot facility including an outdoor playground would be constructed to service approximately 200 children. Demolition of the concrete pad associated with the Engine Can Yard in addition to construction of a parking lot would be implemented as part of the proposed action. The proposed action would provide

separate areas and programs for children ranging in age from six weeks to five years. The facility would be located within the south/central part of the base to accommodate those individuals working on the south side of the base. (EA Section 1.4, page 1-3)

DESCRIPTION OF THE NO-ACTION ALTERNATIVE

By definition, the no-action alternative is a continuation of existing conditions. Therefore, for this EA, the no-action alternative is continued use of the base's child development centers without construction of a new facility. (EA Section 1.5, page 1-3)

DESCRIPTION OF THE ALTERNATIVE ACTION

The Southwest Site alternative is located within undeveloped land in the South Forty District of the base. Implementation of this alternative would result in construction of a similar facility, playground and parking lot. This location is approximately 0.5 miles from Military Family Housing. (EA Section 1.6, page 1-3)

ANTICPATED ENVIRONMENTAL EFFECTS

Resource areas not affected by the proposed action, alternative action, and the no-action alternative were air quality, land use, topography, cultural, socioeconomic resources, solid waste, water resources, transportation and utilities. (EA Section 1.9, pages 1-5 to 1-7)

Based on the analyses presented in the EA, no adverse or significant impacts were identified to the following resources: biological resources (EA Section 2.2, pages 2-2 to 2-3), environmental justice and protection of children (EA Section 2.2, page 2-4) and Installation Restoration Program (EA Section 2.2, pages 2-5 to 2-6).

CUMULATIVE IMPACTS

Cumulative impacts of the proposed action when added to other past, present and reasonably foreseeable future actions were evaluated and found to be insignificant. Existing and future projects involving development within the vicinity of the proposed action area would occur but best management practices would be utilized to reduce overall impacts to water resources and air quality. (EA Section 2.7, pages 2-7 to 2-8)

PUBLIC NOTICE

A Notice of Availability for public review of the Draft EA was published in the Daily Oklahoman on 22 January 2010. The Draft EA was available for public review at the Midwest City Public Library. The public review period lasted until 5 February 2010, and no public comments were received; therefore, no comments were incorporated as part of the Final EA.

FINDING OF NO SIGNIFICANT IMPACT

The proposed action entails the construction of a 31,667 square foot facility including an outdoor playground to service approximately 200 children on land previously developed and utilized as an Engine Can Yard in the South Forty District of the base. Based upon my review of the facts and analyses contained in the EA, I conclude that the proposed action will not have a significant impact on the natural or human environment. An environmental impact statement is not required for this action. This analysis fulfills the requirements of the NEPA, the President's Council on Environmental Quality and 32 CFR Part 989.

Allen J. Jamerson

Date 22 Mar 10

ALLEN J. JAMERSON, Colonel, USAF
Commander, 72d Air Base Wing

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List of Acronyms

ABW	Air Base Wing
AFB	Air Force Base
AICUZ	Air Installations Compatible Use Zone
AFI	Air Force Instruction
APZ	Accident Potential Zone
BMP	Best Management Practice
CDC	Child Development Center
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
dBA	Decibels (Acoustic)
DNL	Day-Night Average Sound Level
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EO	Executive Order
FEMA	Federal Emergency Management Agency
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
FSS	Force Support Squadron
FY	Fiscal Year
HMMP	Hazardous Materials Management Program
HVAC	Heating, Ventilation and Air Conditioning
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOI	Notice of Intent
OC-ALC	Oklahoma City Air Logistics Center
OCAMA	Oklahoma City Air Materiel Area
OKR	Oklahoma Regulation
SHPO	State Historic Preservation Officer
SWPPP	Storm Water Pollution Prevention Plan
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

1.0 Purpose and Need and Description

1.1 Purpose and Need for Action

The purpose and need of this action would be to provide childcare facilities at Tinker Air Force Base (AFB) in support of approximately 29,624 employees of which 14,000 are military personnel. In accordance with Air Force Instruction (AFI) 34-248: *Child Development Centers* (CDCs) and Force Support Squadron (FSS)'s mission statement, the Base is required to provide quality, available, and affordable services for childcare. Tinker AFB is deficient in meeting only 60% of current childcare needs. There are currently 245 children on the wait list. The average wait time for on-base child care is 16 months. In accordance with AFI 34-248, if there is a waiting list for full day-care, FSS is required to develop a plan for meeting the additional need.

Sufficient childcare facilities are not available on Tinker AFB to meet workforce needs. Eligible families must use off-base child care facilities that are expensive and distant from the base. On-base costs average $70 per week compared to $148 per week off base. Tinker AFB military members and employees often work extended hours to support essential war-fighter requirements. The lack of extended hours at these off-base facilities pose problems for parents who work those irregular hours.

Currently Tinker AFB has two day care facilities one on the east side, Building 3904 and one on the west side, Building 5510, as shown in Figure 1. These facilities service 200 children each and are logistically located to accommodate Tinker AFB's work force child care needs. Overall Tinker AFB is deficient in providing available childcare for 245 children. Projects to add on to Buildings 3904 and 5510 have been programmed and funded as Emergency Intervention Projects through the Secretary of Defense. A 3450-square foot addition will be constructed to the CDC East (Building 3904) and a 2,000-square-foot addition will be constructed onto the CDC West (Building 5510) in addition to the replacement of the Heating Ventilation and Air Conditioning (HVAC) system. These two projects will result in care being available for 49 children resulting in an overall deficit of providing childcare to 197 children. Tinker had programmed a MILCON project to construct a third CDC, Project WWYK043003A for execution in Fiscal Year (FY) 2012, however American Recovery and Reinvestment Act funds became available and this action is proposed for FY 2010. Under this project a 31,667 square foot facility would be constructed to service approximately 200 children. FSS's overall plan is to upgrade the existing CDC facilities and construct the third facility so that Tinker AFB can meet the base needs and accommodate the shortfall.

1.2 History of the Formulation of Alternatives

The National Environmental Policy Act (NEPA) requires consideration of reasonable alternatives. The Council on Environmental Quality (CEQ) regulations require all reasonable alternatives to be rigorously explored and objectively evaluated.

This chapter describes the two alternatives that were carried forward and one that was considered but eliminated because it did not meet the selection criteria.

Any alternative to address the purpose and need for safe childcare, should at a minimum:

- Provide adequate space and healthy environment for child growth and development
- Accommodate Tinker AFB deficiency in meeting child care needs
- Provide solution on timeframe and budget that allows for successful execution of FSS mission and Air Force guidance for childcare
- Availability of funds for construction
- Compatible land use for CDC

1.3 Alternatives Eliminated from Further Consideration

The alternatives evaluated were to (a) utilize off-base facilities, (b) construction of the CDC on land previously developed and utilized as an Engine Can Yard and (c) construction of Child Development Center on undeveloped land on the south side of the base.

As discussed, utilizing off-base facilities is inconvenient and expensive for military and civilian personnel. The lack of off-base facilities having extended hours is a problem for those military and civilian parents who work irregular hours. This alternative meets the purpose of providing childcare but not the need of providing available and affordable childcare. This alternative was eliminated from further consideration.

The alternative to construct a new facility meets the overall purpose and need of providing available and affordable childcare services. A $14.6 M Military Construction project has been programmed for execution in FY 2012 however American Recovery and Reinvestment Act funds became available and this action is proposed for FY 2010. Under this project a 31,667 square foot facility would be constructed to service approximately 200 children. FSS's overall plan is to upgrade the existing CDC facilities and construct the third facility so that Tinker AFB can meet the base needs and accommodate the shortfall. Construction of the Child Development Center on (b) land previously developed and utilized as an Engine Can Yard and (c) construction of Child

Development Center on undeveloped land is viable therefore these alternatives were carried forward.

1.4 Description of the Proposed Action

The Proposed Action is to construct a new Child Development Center on land previously developed and utilized as an Engine Can Yard in the South Forty District of the base. The location of the Proposed Action is adjacent to and within walking distance of Military Family Housing. A $14.6M Military Construction project had been programmed for execution in FY 2012 however American Recovery and Reinvestment Act funds became available and this action is proposed for FY 2010. Under the Proposed Action a 31,667 square foot facility including an outdoor playground would be constructed to service approximately 200 children. Demolition of the concrete pad associated with the Engine Can yard in addition to construction of a parking lot would be implemented as part of the Proposed Action. The Proposed Action would provide separate areas and programs for children ranging in age from six weeks to five years. The facility would be located within the south/central part of the base to accommodate those individuals working on the south side of the base. Construction of the new facility has been proposed to accommodate the deficiency of on-base child care requests. Sufficient childcare facilities are not available on Tinker AFB to meet workforce needs. There are no available buildings on base with a compatible use that could be used for childcare services. The only buildings that have available space are within the industrial or airfield operation zones which are clearly not compatible for childcare services.

1.5 No Action Alternative

By definition, the No-Action Alternative is a continuation of existing conditions. Therefore, for this EA, the No-Action Alternative is continued operation of the existing CDCs. Construction of the additions to the CDCs would still occur. Overall there would still be a deficit in meeting existing childcare needs for Tinker AFB's military and civilian personnel.

1.6 Southwest Site Alternative

The Southwest Site alternative is located within undeveloped land in the South Forty District of the Base. Implementation of this alternative would result in construction of a similar facility, playground, and parking lot. This location is isolated and approximately ½ mile from Military Family Housing.

1.7 Location of the Proposed and Alternative Actions

Figure 1-1 presents Tinker AFB with an inset of the existing CDCs. CDC West is located within the Community Development Area of Tinker AFB. CDC East is located within the administrative area on the east side of the base. Figure 1-2 shows the location of the Proposed Action and the Southwest Site Alternative

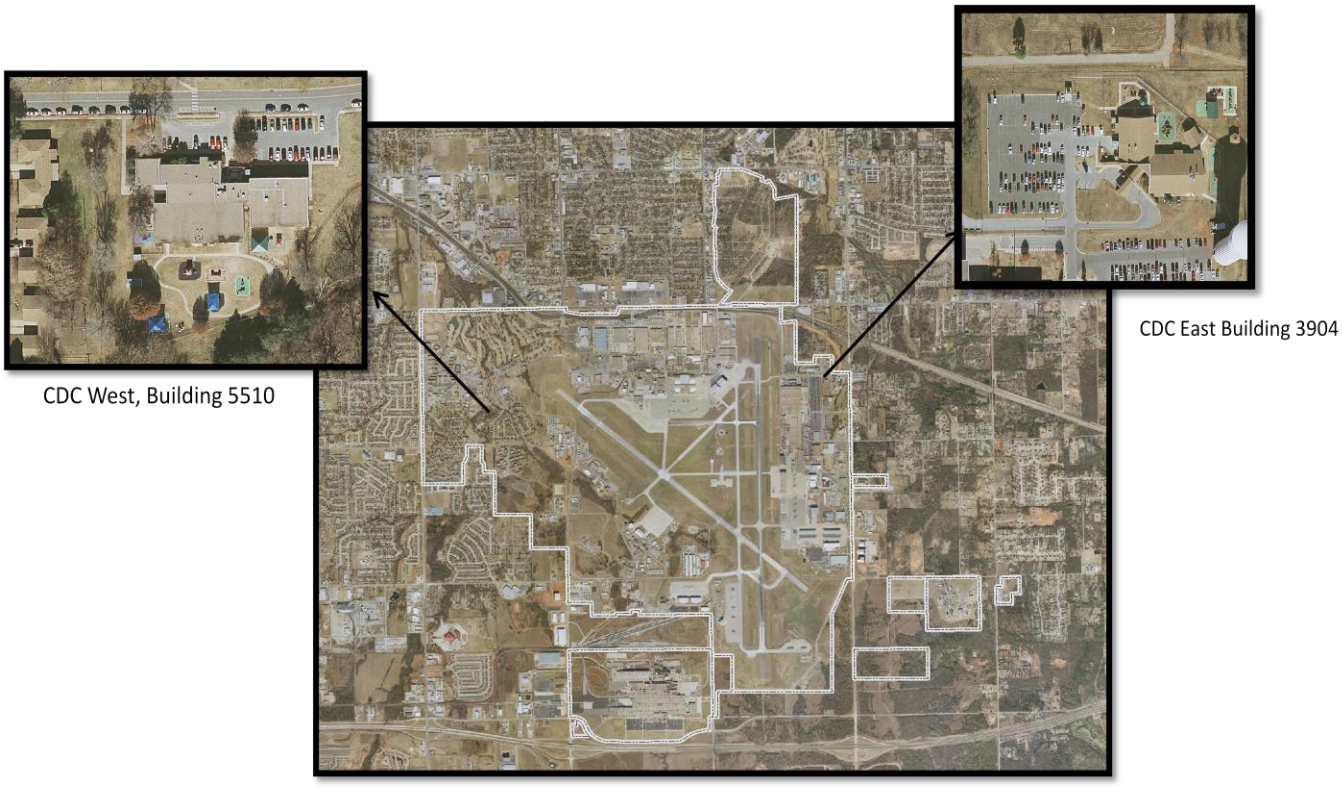


Figure 1-1 Tinker Air Force Base

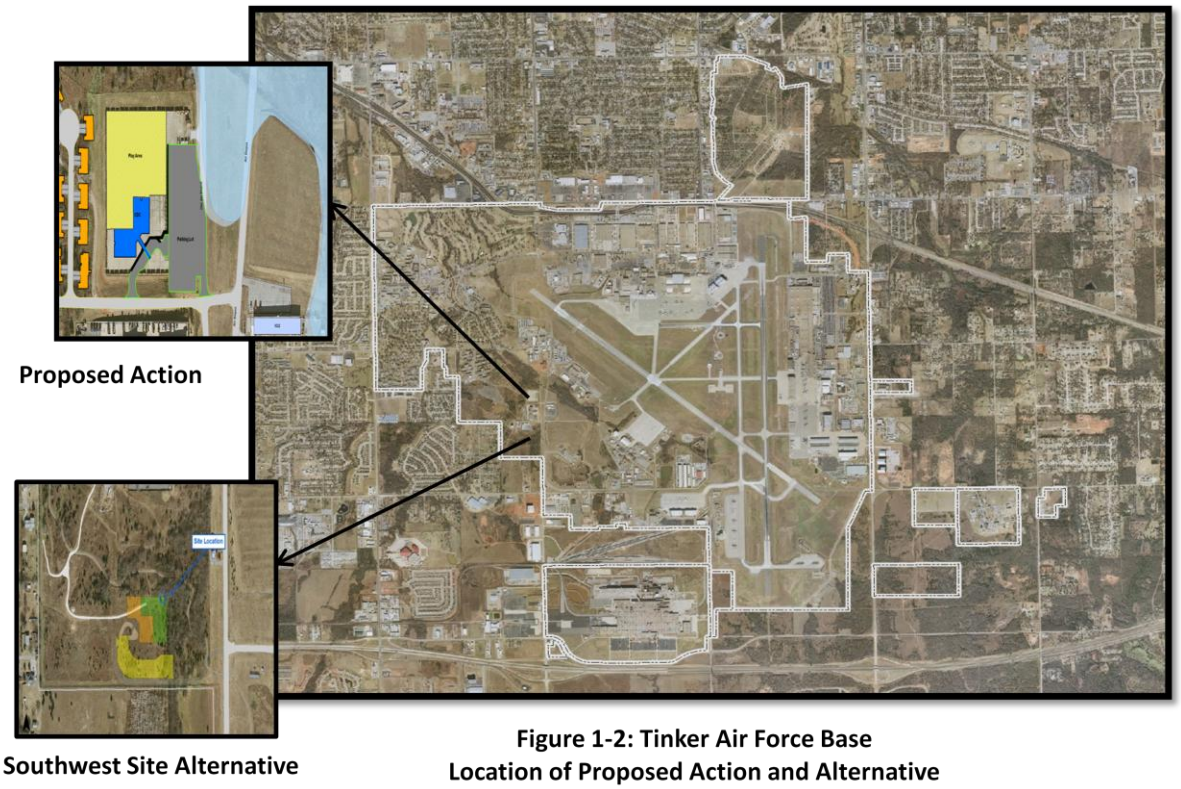


Figure 1-2: Tinker Air Force Base
Location of Proposed Action and Alternative

1.8 Scope of the Environmental Analysis

NEPA requires federal agencies to consider environmental consequences in their decision-making process. The intent of NEPA is to protect, restore, or enhance the environment through well-informed federal decisions. CEQ was established to implement NEPA and issued Title 40 of the Code of Federal Regulations (CFR) Parts 1500-1508. The United States Air Force has CEQ-approved regulations (32 CFR 989), which supplement 40 CFR 1500-1508.

1.9 Analyses Eliminated from Further Consideration

It has been determined that the following resource areas are excluded from further consideration in this document. These resource areas are unaffected by the Proposed Action, the Alternative Action, and the No-Action Alternative.

- Air Quality-With both the Proposed and Alternative Actions, facility construction would produce temporary, minor amounts of fugitive dust emissions but significant impacts would be avoided through use of construction Best Management Practices to control fugitive dust emissions. Any temporary impacts to air quality would be managed through BMPs such as watering exposed soils, soil stockpiling, and soil stabilization. With Both Actions, there would be minor combustion emissions from construction related equipment. Short-term increases in Carbon Monoxide (CO), Volatile Organic Compounds (VOCs), Nitrogen Oxide (NO), Sulfur Dioxide (SO), and Particulate Matter (PM) would occur. Oklahoma is in attainment for each of these and construction activities would only slightly elevate their concentrations. There would be no long-term impacts to air quality as a result of implementing the Proposed Action or the Alternative Action.

- Land Use-The Proposed Action and the Alternative Action are sited within Tinker AFB's South Forty Development District and are adjacent to both on-base and off-base residential areas, which are compatible land use designations. The location of the Proposed Action is 0.53 miles from the active airfield and the Alternative Action is 0.62 miles from the airfield. Both are outside the Accident Potential Zones (APZs) and would not be impacted by airfield operations. Both the Proposed Action and the Alternative Actions are located within the 65 decibel Day-Night Average Noise Level (db DNL). With both the Proposed Action and the Alternative Action there would be a temporary increase in noise levels during construction but there would be no changes to the overall Air Installations Compatible Use Zones (AICUZ) noise contours.

- Topography/Soils- The proposed construction for both the Proposed Action and the Alternative Actions would disturb approximately 5.8 acres of land, representing 0.09% of the land on base. The location of the Proposed Action would occur within a developed area. The location of the Alternative Action would convert undeveloped land but the impacts to topography and soils would be insignificant.

- Cultural Resources- An Archaeological Survey was accomplished on the land surrounding the Proposed Action and Alternative Action locations. The survey determined there were no National Register eligible archaeological sites located within the vicinity of the Proposed Action or the Alternative Action. The National Historic Preservation Act requirements have been met. Therefore further analysis for cultural resources on this project is not needed.

- Socioeconomic Resources- Total project cost for the construction of the Child Development Center would be $ 14.6M, representing approximately 1.4 % of the local economy. There would be a slight economic gain as the construction and operation of the Center would result in providing jobs but the overall impact to local employment would be 0.3%. Both the Proposed Action and the Alternative Action would be a boost to the local economy but would not significantly impact it.

- Hazardous Materials/Solid Waste- Use of hazardous materials as a result of the Proposed Action and the Alternative Action would be limited to construction materials. The overall quantities used would be minimal and would not be a significant increase in the quantities

of hazardous material used or waste generated on Tinker AFB. The contractor would follow established base policies and procedures for purchase, use, and disposal of material which includes recycling of material where feasible. Local landfills have the capacity to accept the amount of waste generated. The contractor performing the work would be required to follow established base procedures, including Section 0720: Environmental Requirements for Construction Contracts.

- Water Resources: Both the Proposed and Alternative Actions are located outside the 100-year floodplain and there are no wetlands within the direct vicinity of the proposed project locations. Implementation of the Proposed Action or the Alternative Action would require compliance with Oklahoma Regulation (OKR) 106450: General Permit for Stormwater Discharges from Construction Activities within the State of Oklahoma. All construction sites require a Notice of Intent (NOI) and a Storm Water Pollution Prevention Plan (SWPPP) identifying site specific Best Management Practices such as silt fencing and management of construction materials to prevent contamination of water resources. The contractor would be required to follow Section 0720: Environmental Requirements for Construction Contracts.
- Transportation- The Proposed Action and the Alternative Action would result in temporary transportation impacts. No long term impacts would occur as a result of the Proposed Action or the Alternative Action. Traffic patterns would be managed to ensure safe and efficient drop-off and pick-up of children.
- Utilities- Construction of the Child Development Center as a result of the Proposed Action or the Alternative Action would have little impact on Tinker AFB's overall energy consumption. The minor increase in demand for approximately 200 children would be an insignificant impact to utility resources basewide.

1.10 Analyses Carried Forward

The long-term issues of primary concern in this EA are impacts on natural resources and cumulative impacts. The resources analyzed in more detail in this EA include biological resources, environmental justice and protection of children, and the installation restoration program.

2.0 Existing Environmental Conditions and Environmental Consequences

2.1 Introduction

This section discusses the environmental resources that may be affected by the Proposed Action. The components of the affected environment discussed in this section are those for which impacts have been identified or which require regulatory consultation review. The following areas are discussed within this section: mission; air quality; water resources; and environmental justice. The following information is based upon the *Tinker AFB General Plan* (Tinker AFB, 2005) and the *Tinker AFB Integrated Natural Resources Management Plan* (INRMP) (Tinker AFB, 2007).

2.2 Location, History, and Current Mission of the Installation

Tinker AFB is headquarters for Oklahoma City-Air Logistics Command (OC-ALC) and the primary mission is to provide responsive installation and support services to all installation missions. Tinker AFB covers approximately 6000 acres and is located in Oklahoma County, ten miles southeast of downtown Oklahoma City, Oklahoma. Midwest City to the north and Del City to the northwest are incorporated areas immediately surrounding Tinker AFB.

Tinker Field was established in 1941 as a maintenance and supply depot, and immediately following World War II, expanded to include Douglas Aircraft assembly plant. At this time, Tinker Field was renamed as the Oklahoma City Air Material Area (OCAMA). From the 1950s to the 1980s, the OCAMA continued to support additional aircraft and weapons. In 1974, the depot was renamed Oklahoma City Air Logistics Center. In 1991, two Navy E-6 squadrons were added to maintain a flying/communications link between the White House and ballistic missile submarines around the world. Tinker AFB also provided front line support to the forces engaged in Operation Desert Shield and Desert Storm in the early 1990s, and the more recent Operation Enduring Freedom, Operation Iraqi Freedom, and the Global War on Terrorism.

The primary purpose of an EA is to identify potential impacts of a major federal action on the environment. Identification of potential impacts in this EA included consideration of both the context and the degree of the impact. Where feasible, distinctions are made between short-term, long-term, negligible, and adverse impacts. A negligible impact may be inconsequential or be unlikely to occur; an adverse impact would have negative consequences. If the current condition of a resource is improved or an undesirable impact is lessened, the impact is considered beneficial. Finally, a “no impact” determination is made when the Proposed Action does not noticeably affect a given resource. Where appropriate, cumulative impacts are discussed. Cumulative impacts are those likely to occur over a long period of time or as a result of combining the expected impacts of two or more unrelated actions. This section presents the potential environmental consequences at the project site.

2.2.1 **Biological Resources**

Several species of concern can be found near the sites of the Proposed Action and the Alternative Action. Base-wide surveys for the Texas horned lizard were conducted in 2004. During the surveys, Texas horned lizards or their scat were found in these delineated areas. Several Texas horned lizards were sighted in designated Texas horned lizard habitat in the area of the Proposed Action and the Alternative Action. The barn owl, burrowing owl, and Swainson's Hawk occur on the Base as well. The previously listed migrant race of shrikes (*migrans*), the barn owl, the burrowing owl, and the Swainson's Hawk have the potential to occur on Base near the Proposed Action and the Alternative Action .

A number of fur-bearing mammal species inhabit Tinker AFB. Terrestrial furbearers include the coyote, skunk, raccoon, opossum, and beaver. Human-wildlife conflicts are not uncommon at Tinker AFB. Beaver dam building activity has damaged ornamental trees, caused flooding problems, and disabled spill gates. Skunks provide a nuisance to personnel and residents, and coyotes pose an aircraft hazard.

Grasslands in the Proposed Action and Alternative Action construction areas vary in species composition. The majority of the two sites are dominated by improved turf (predominantly Bermuda grass) with surrounding areas of mixed non-native SI grass and non-native fescue (*Festuca arundinacea*). The predominance of non-native grasses indicates that these areas were planted with these species, and may have been used for grazing or hay production.

Vegetation in the area is typical of that found in an urban setting. The area near the vicinity is predominately administrative, commercial, and industrial buildings having grass lawns with ornamental shrubbery and trees scattered throughout. The plant community is composed of improved turf grasses (predominantly Bermuda grass), shrubbery (boxwoods), and ornamental trees (Bradford pear).

The riparian vegetation community in the area around Tinker AFB contains such species as American elm (*Ulmus Americana)*, slippery elm (*Ulmus rubra*), hackberry (*Celtis* spp.), and cottonwood (*Poplus deltoids*) (Parsons, 2002). Riparian areas occur adjacent to streams or drainage channels or in low-lying areas where water availability is relatively greater than the surrounding landscape. The crowns are closed, or nearly so (greater than 60 percent canopy cover) (Hoagland, 2000; TPWD, 1995), and the trees are generally over 30 feet tall.

Biological resources analyses used the following evaluation criteria to assess the impacts of the alternatives:

Diminished habitat for a plant or animal species;

Diminished regionally important plant or animal species; and

Interference with wildlife movement or reproductive behavior;

2.2.1.1 **Proposed Action**

The Proposed Action occurs at a site in the South Forty Area that is currently open space. The Texas horned lizard occurs in this area. Only the previously listed migrant race of shrikes (*migrans*) has the potential to occur on Base near the Proposed Action.

Under a statewide closed season, the lizard is protected by state law which makes it unlawful at any time to possess or to kill individuals of these species or to remove any individuals of these species from their natural habitats. The base is required to provide for the protection and conservation of state listed protected species when practicable. Although not required by the Endangered Species Act, provide similar conservation measures for species protected by state law when such protection is not in direct conflict with the military mission. When conflicts occur, consult with the appropriate state authority to determine if any conservation measures can be feasibly implemented to mitigate impacts. Since the Texas horned lizard is protected by state law, the contractor shall provide for the protection and conservation of the lizard as practicable. If practicable, possible mitigation alternatives suggested by the Oklahoma Department of Wildlife Conservation could include such things as, but not be limited to 1) enhancing or developing horned lizard habitat at other locations on the base or other military property, 2) purchasing and protecting land with established lizard populations or which could be used to introduce new lizard populations, and 3) conducting research targeting impacts of development on lizard populations and possible ways to lessen the impacts of development on lizard populations.

2.2.1.2 **Southwest Site, Alternative Action**

The land on which the Alternative Action would be located is currently categorized as habitat for the Texas horned lizard, a state sensitive species. The Texas horned lizard is an Oklahoma state species of concern. Under a statewide closed season, the lizard is protected by state law, which makes it unlawful at any time to possess or to kill individuals of these species or to remove any individuals of these species from their natural habitats. If practicable, possible mitigation alternatives suggested by the Oklahoma Department of Wildlife Conservation could include, but are not limited to 1) enhancing or developing horned lizard habitat at other locations on the base or other military property, 2) purchasing and protecting land with established lizard populations or which could be used to introduce new lizard populations, and 3) conducting research targeting impacts of development on lizard populations and possible ways to lessen the impacts of development on lizard populations.

2.2.1.3 **No Action Alternative**

Under the No Action Alternative, construction of the new CDC facility would not be performed. Plant and animal species resources, including T&E species, and wetlands and waterbodies would not change from baseline conditions.

2.2.2 Environmental Justice and Protection of Children

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, mandates the investigation of environmental effects on children. This EO acknowledges that children may suffer disproportionately from environmental health risks and safety risks. Therefore, each federal agency is required to make it a priority to identify and assess environmental health and safety risks that may disproportionately affect children and ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health or safety risks.

This section presents baseline conditions for the health and safety of children.

2.2.2.1 Proposed Action

The Proposed Action is located adjacent to Building 1130, Tinker AFB Vehicle Maintenance Facility where vehicle maintenance operations involving car maintenance and painting occurs. Estimated exposure levels and regulatory-recommended inhalation toxicity values were used to estimate the potential carcinogenic health risks and non-cancer hazards for CDC workers and children. Consistent with USEPA's most current guidance on estimating inhalation risks and hazards, the combined risk or hazard from exposure to multiple constituents was evaluated by adding the risks or hazards for individual constituents (USEPA, 2009b). USEPA's target range for carcinogenic risk associated with Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) sites and specified in the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations [CFR] 300.430) is 1 in 10,000 (1 × 10-4) to 1 in 1 million (1 × 10-6). USEPA's noncancer hazard target, by target organ or critical effect, is unity (one) (USEPA, 1991). The ODEQ uses a target risk level of 1 x 10-5 and a target hazard level of one (ODEQ, 2004). The estimated risks and hazards associated with potential exposures of future CDC workers and children were less than ODEQ (2004) target levels and were less than USEPA (1990, 1991) target levels. With construction of the Child Development Center, the health of the children would be protected and there would be no potential impacts to environmental justice. (See Appendix A)

2.2.2.2 Southwest Site, Alternative Action

Under the Alternative Action, there would be no impacts to environmental justice or protection of the children.

2.2.2.3 No Action Alternative

Under the No-Action Alternative, conditions would remain the same therefore, there would be no impacts to environmental justice or protection of the children.

2.2.3 Installation Restoration Program

The Proposed Action and Alternative Action are located within CG038. The primary organic contaminant at CG038 is TCE; secondary organic contaminants include *cis*-1,2-dichloroethene (*cis*-1,2-DCE), 1,2-dichloroethane (1,2-DCA), and vinyl chloride. Contaminated groundwater is primarily within the USZ and, to a lesser extent, the overlying Hennessey Water Bearing Zone (HWBZ) and underlying LSZ. Groundwater flow is generally semi-radially from topographic highs toward creek drainages. Groundwater flow in the area of the Proposed Action and Alternative 1 is generally to the southwest at a depth of 60 feet bgs. CG038 is currently undergoing groundwater pumping and treatment.

2.2.3.1 Proposed Action

The Proposed Action site is located in ERP site CG038. The primary organic contaminant in CG038 groundwater is TCE; secondary organic contaminants include *cis-1,2*-DCE, 1,2-DCA, and vinyl chloride. The contaminants are primarily within the USZ and, to a lesser extent, the overlying HWBZ and underlying LSZ. The TCE plume does not extend beneath the Proposed Action site.

Based on widespread soil sampling done at Tinker it is highly unlikely that any solvent type contaminants would remain in the shallow surface (including up to 10-foot depth for the excavation) due to volatilization of the organics and there is no known history of disposal at the site. Vapor intrusion, although always a possibility above a groundwater plume is also highly unlikely due to the depth to contaminated groundwater (USZ around 60 feet deep), the clayey nature of overlying Hennessey Group sediments, and the relatively low volatile organic concentrations in the groundwater.

Desiccation cracks (fractures) generally extend downward for only 30 feet or so, and therefore, there is a very limited pathway to get vapors to the surface. Finally, an extraction and treatment system (pump and treat) is operating in the area.

With the Proposed Action, the proponent would be required to ensure that procedures are in place for proper removal of the existing soil pad and disposal of concrete and soil materials. Standard procedures in Section 0720: Environmental Requirements for Construction Contracts require that the contractor follow proper procedures in the event that construction conditions indicate the possibility of soil contamination.

Human health risk modeling indicated that vapor intrusion levels would be well below ODEQ and USEPA target levels. The estimated risks and hazards associated with potential exposures of future CDC workers and children were less than ODEQ (2004) target levels and

were less than USEPA (1990, 1991) target levels. With construction of the Child Development Center, there are no potential groundwater, restoration or restoration impacts.

2.2.3.2 Southwest Site, Alternative Action

The Alternative Action site is also located within site CG038. As with the Proposed Action precautions would need to be in place to ensure proper removal and disposal of soil.

With the Alternative Action, a portion of the groundwater treatment system and three extraction wells would have to be relocated. The Alternative Action is located atop the groundwater treatment system. Relocation of the system could result in the project being too costly to implement.

2.2.3.3 No Action Alternative

Under the No Action Alternative, construction of the new CDC facility would not be performed. There would be no change from baseline conditions for the IRP.

2.3 Unavoidable Adverse Environmental Effects

No unavoidable adverse environmental effects from the implementation of either the Proposed Action or the Alternative Action have been identified through this EA.

2.4 Compatibility with Objectives of Federal, Regional, State, and Local Land Use Plans and Policies

The Proposed Action or Alternative Action is compatible with Tinker AFB plans and policies and would not interfere with mission objectives of any tenant organizations. The Proposed Action or the Alternative Action would result in construction of a 31,667 square foot facility in addition to a 30,000 square foot playground and a 45,000 square foot parking lot. Both the Proposed Action and the Alternative Actions are compatible with surrounding land uses. Both the Proposed Action and the Alternative Actions are compatible with the *General Plan* (Tinker AFB, 2005) and are not contrary to existing federal, regional, state, or local land use plans or policies.

2.5 Relationship Between the Short-Term Use of the Environment and Long-Term Productivity

The Proposed Action and Alternative Action would not affect the long-term productivity of the environment; no significant environmental impacts or depletion of natural resources have been identified through this EA.

2.6 Irreversible and Irretrievable Commitment of Resources

The preferred alternative would represent a commitment of fiscal resources during the construction process. No irreversible or irretrievable commitment of natural resources has been identified through this EA.

2.7 Cumulative Environmental Consequences

The CEQ regulations implementing NEPA require agencies to consider the potential for cumulative impacts of the action alternatives. "Cumulative impact" is defined in 40 CFR 1508.7 as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant factors taking place over time."

Implementation of the Proposed Action or Alternative Action and associated potential environmental impacts would occur concurrently with other projects and developments proposed on Tinker AFB. In addition to the Proposed Action or the Alternative Action, other projects planned on Tinker AFB include:

- Military Family Housing Privatization
- Realignment of Air Depot Road/Tinker Gate
- Construction of Medical Clinic
- Physical Fitness Center Construction
- Reconfigure Fire Pond
- Addition to Child Development Centers, Building 5510 and 3904

The projects listed above are planned for construction during roughly the same timeframe as implementation of the Proposed or Alternative Action would occur. Consequently, the potential exists for cumulative environmental impacts to occur with regard to air quality, surface water, noise, socioeconomics, and traffic. Cumulative air quality, surface water, and noise impacts are expected to be less than significant since all projects would be required to implement BMPs to reduce air emissions below significance thresholds, protect storm water quality, and comply with local noise regulations. With regard to traffic and circulation, short-term impacts to traffic caused by additional construction equipment and workers traveling along surrounding roadways could potentially cause a short-term adverse cumulative impact during peak traffic hours but long-term impacts would not occur. For water quality, the project for Military Family Housing Privatization includes plans to demolish 34 housing units located within the 100 yr floodplain, while replacing 398 units overall. The amount of floodplain capacity restored will be approximately 20,140 cubic yards. For the project to Re-Align Air Depot Road, the project will primarily involve working with surfaces and roadways that have already been developed. For the Construction of the Medical Facility, this project required that a detention structure be built to hold the capacity of a 100-year rain event. Another project planned is to Reconfigure Fire Pond which would result in additional

floodplain capacity upstream of the Child Development Center. There are minimal impacts to the 100-yr floodplain as the addition to CDC West is accomplished. CDC East is located outside of the 100-yr floodplain. The additions to both of these facilities will occur in locations that are developed. Implementation of the Proposed Action or the Alternative Action would not introduce significant cumulative impacts to the environment. The Proposed Action is located on land that is currently developed. Through the use of BMPs cumulative air quality, surface water, and noise impacts as a result of implementation of the Proposed Action or the Alternative Action would be less than significant.

2.8 Inadvertent Discoveries of Cultural Resources

While the likelihood of discovering significant cultural resources such as archeological deposits would be extremely minimal during the proposed construction, any such inadvertent discoveries would be processed under Tinker AFB Integrated Cultural Resource Management Plan (ICRMP) Section E.7.3, Inadvertent Discoveries and provisions of applicable law(s) such as NHPA Section 106 (36CFR800.13).

2.9 Public Notification

Tinker Air Force Base made the draft EA available for public review and comment from 22 January through 5 February 2010. The Air Force placed advertisements in the Daily Oklahoman and the Tinker Take Off, local and installation newspapers respectively, on 22 Janaury informing the public of the public review period and the location of the document for review. No comments regarding the proposed project, the EA, and the FONSI/FONPA were submitted to the Air Force by any members of the public.

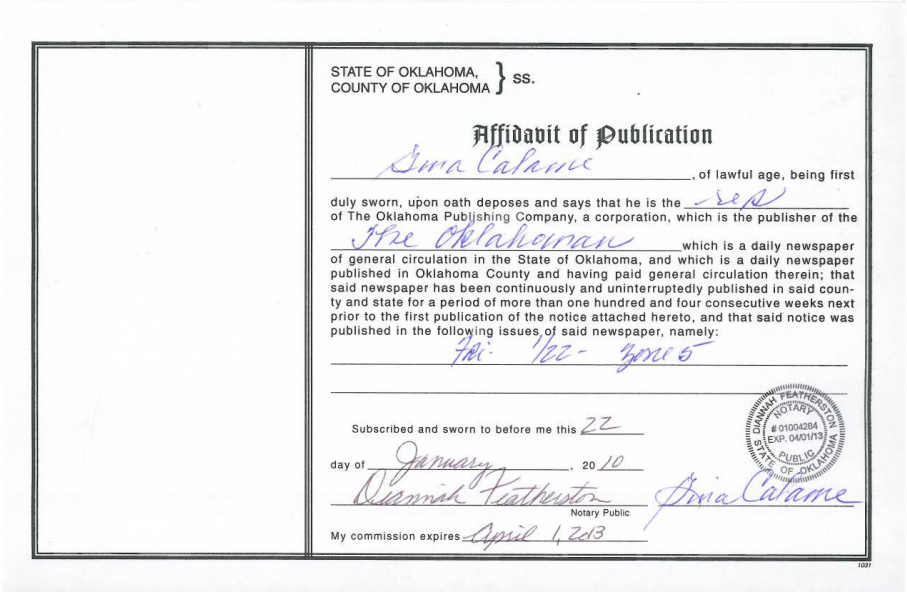
3.0 List of Preparers

3.1 Tinker AFB, Oklahoma

Cindy Garrett: Ms. Garrett has 13 years of experience working with Tinker Air Force Base's Environmental Management Division. She currently manages the base's environmental impact analysis program ensuring the base's assets and environment are protected while the Air Force mission is maintained. She has also managed the base's water program where her primary responsibilities were overseeing industrial operations and ensuring that they were performed in a manner that complies with the base's permits as well as federal, state, and local regulations. Ms. Garrett has a Master's Degree in Environmental Engineering with a focus on water resources from the University of Oklahoma.

Timothy T. Taylor: Cultural Resource Program Manager responsible for Cultural Resources and assistance with NEPA compliance at Tinker AFB. Mr. Taylor has an A.A. degree in Liberal Studies from Rose State College. He has 12 years of experience working as the Cultural Resource Program Manager and 8 year experience working with the NEPA Program. Other experience includes 3 years of experience working in the Air Quality Program, 4 years working in the Asbestos and Lead-based Paint Program, and 6 years working as a Bio-environmental Engineering Technician in the USAF

4.0 Public Notification



STATE OF OKLAHOMA, COUNTY OF OKLAHOMA } SS.

Affidavit of Publication

Gina Calame, of lawful age, being first duly sworn, upon oath deposes and says that he is the Rep of The Oklahoma Publishing Company, a corporation, which is the publisher of the The Oklahoman which is a daily newspaper of general circulation in the State of Oklahoma, and which is a daily newspaper published in Oklahoma County and having paid general circulation therein; that said newspaper has been continuously and uninterruptedly published in said county and state for a period of more than one hundred and four consecutive weeks next prior to the first publication of the notice attached hereto, and that said notice was published in the following issues of said newspaper, namely:

1/22 - Zone 5

Subscribed and sworn to before me this 22 day of January, 2010

Dianna Featherston
Notary Public

DIANNA FEATHERSTON NOTARY PUBLIC # 01004284 EXP. 04/01/13 STATE OF OKLAHOMA

Gina Calame

My commission expires April 1, 2013

1027

Public Notice

Tinker Air Force Base Invites Public Comment
Environmental Assessment
Construct Child Development Center

The 72nd Air Base Wing at Tinker Air Force Base has prepared an Environmental Assessment (EA) which is available for public review and comment.

Pursuant to the Council on Environmental Quality regulations and in accordance with the National Environmental Policy Act, an EA has been performed to evaluate the construction of a new Child Development Center to be located within the NE ¼ of Section 21, Township 11N, Range 2W.

No significant environmental impacts were identified through this EA.

The public is invited to review the draft assessment and make comments. Written comments and questions can be submitted before close of business on the 5th of February.

The final draft of the EA is available to the public at the Tinker Information Repository located in the Midwest City Public Library on Reno Avenue. Hours of operation are 9:00 a.m. to 9:00 p.m. Monday thru Thursday; 9:00 a.m. to 5:00 p.m., Friday and Saturday; and 1:00 to 5:00 p.m. on Sunday.

The public may submit written comments to the address below:
72d Air Base Wing Public Affairs Office
Brion Ockenfels
7460 Arnold Ave., Suite 127
Tinker Air Force Base, Oklahoma 73145
Phone: 405-739-2027/26
E-mail: brion.ockenfels@tinker.af.mil

5.0 References

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6.0 Appendix

Human Health Risk Assessment for Proposed Child Development Center

Human Health Risk Assessment

This technical memorandum presents the methodology, assumptions, and results of a HHRA prepared for a proposed CDC to be located north of Building 1130 at Tinker AFB. The purpose of this HHRA is to determine the potential human health risks and hazards associated with exposure to modeled air emissions released from Building 1130.

The HHRA was prepared in accordance with USEPA guidance, primarily *Risk Assessment Guidance for Superfund (RAGS), Volume 1: Human Health Evaluation Manual, Parts A, D, and F* (USEPA, 1989; 2001; 2009b).

Background

The CDC is planned to be constructed due north of Building 1130 (Figure 1). As part of the HHRA for the CDC, potential risks from nearby air emissions sources were considered. Building 1130 is the location of the Tinker AFB motor pool facility, which is used to conduct maintenance activities for the Tinker AFB fleet (for example, vans and trucks) and off-road vehicles (for example, forklifts). These activities include routine maintenance, vehicle repair, and body work; the building also houses a vehicle washing area. Building 1130 is assumed to operate 8 hours per day, 5 days per week. All work is conducted indoors; however, the rolling exterior doors are often opened during warmer months for temperature control.

Potential Receptors

Volatile and/or particulate emissions released during operations at Building 1130 have the potential to contribute to downwind air concentrations in the vicinity of the proposed location of the CDC. Occupants of the CDC could then be exposed via inhalation to the volatile or fugitive dust emissions while outdoors in the play area or indoors (chemicals could enter the CDC through open windows, vents, etc.). The following receptors (that is, occupants) and exposure routes were identified for the inhalation risk assessment:

- Adult CDC Workers – inhalation of volatile and fugitive dust emissions while at the facility, both outside (for example, play area) and indoors
- CDC Children – inhalation of volatile and fugitive dust emissions while at the facility, both outside (for example, play area) and indoors.

The human health conceptual site model presents potential exposure media, exposure points, receptors (current and future), and exposure routes (Figure 2). Attachment 1, Table 2, also summarizes the potential receptors, exposure pathways, and scenarios.

Sources of Air Emissions

Paint-booth operations at Building 1130 use high-volume, low-pressure spray guns. The paint booth uses 3-stage filters which capture more than 93.8 percent of solid particles that are greater than 0.70 microns in size. Studies conducted for the San Diego, California, Air Pollution Control District concluded that almost all solid particulates from HVLP paint gun

overspray are greater than 10 microns in size (CH2M Hill letter to San Diego APCD, October 22, 2009; see Attachment 2).

The quantity of paint used and, in turn, the emissions produced are highly variable and workload-dependent. This is primarily due to unanticipated vehicle accidents and weather (for example, hail) that may damage vehicles. The paint booth operations have seen a marked reduction in activity during the past 10 years. Historically, the vehicle maintenance facility was required to completely re-paint 10 percent of the vehicle fleet each year on a rotating schedule. This requirement is no longer in place, and there is no known plan for it to be re-instated. The spray guns are cleaned in an enclosed unit by spraying a minimal amount of thinner through the gun. The paint supply cups used on the units are disposable and are not cleaned or re-used. Logs of paint and thinner usage are provided to air quality management personnel at Tinker AFB on a monthly basis. These records are maintained as hard and electronic copies at Building 1130. Emissions totals for 2006 through 2009 are provided in the following table. These data include all recorded emissions from Building 1130; however, the paint booth is the primary source.

BUILDING 1130 EMISSIONS 2006 THROUGH 2009

Year	Total Emissions (tons per year)
2006	1.732
2007	0.467
2008	2.210
2009	0.707

A list of constituents from the emissions inventories from 2006 through 2009 is provided in Attachment 1, Table 1. Consistent with USEPA inhalation risk assessment guidance, this assessment only quantitatively estimates risks and/or hazards for constituents with available inhalation toxicity data (USEPA, 2009b). Tinker AFB did not take into consideration the transfer and paint booth filter efficiency when reporting emissions from the paint booth. There are no volatile organic compound (VOC) controls. For non-VOC constituents, a coating transfer efficiency of 65 percent and a filter efficiency of 93.8 percent were applied to the provided emissions. Specification information was not available for chromium, chromium III, and hexavalent chromium. For conservatism, the chromium emissions where assumed to be in the form of hexavalent chromium.

During repair and maintenance activities, some vehicles are idling for a period of time. The vehicle types, fuel used, and idling times vary widely. Because of the lack of records regarding idling and the variability/uncertainty associated with the number and type of vehicles, fuel type, and duration, emission data were not available for use in the risk evaluation. Furthermore, the motor pool facility is an insignificant source of mobile air emissions at Tinker AFB when compared to privately-owned vehicles and aircraft operations.

Paint stripping using chemicals is not performed at the motor pool facility. The only paint stripping conducted are sanding operations (using sandpaper) and is primarily spot or

vehicle sanding prior to paint application. This area is curtained off from the rest of the facility to minimize the travel of airborne materials during the sanding process. There are no refueling activities or underground petroleum storage tanks at the motor pool facility.

Exposure Assessment

Inhalation exposure is quantified by estimating the (1) constituent concentration in air (that is, exposure point concentration), and (2) constituent exposure concentrations (ECs) for each receptor. The constituent concentrations in air were calculated for volatile and fugitive dust emissions using the USEPA's AERMOD dispersion modeling system (USEPA, 2009a).

AERMOD modeling input files were obtained from a previous air modeling project at Tinker AFB. These files included emission source data and building dimension data that were incorporated into this modeling analysis. AERMOD (Version 09292) was run with regulatory default options, including the use of stack-tip downwash, the PRIME building downwash algorithm, default wind profile exponents, and default vertical potential temperature gradients. Modeling was performed according to procedures consistent with the USEPA's *Guideline on Air Quality Modeling* (USEPA, 2003a).

The model was run with one year (2005) of meteorological data. Hourly meteorological data files were processed by and obtained from the ODEQ using the Spencer, Oklahoma, Mesonet stations. The Oklahoma Mesonet data were provided to the ODEQ Air Quality Division courtesy of the Oklahoma Mesonet, a cooperative venture between Oklahoma State University and The University of Oklahoma and supported by the taxpayers of Oklahoma.

Air concentrations were estimated for a 10-meter spaced grid that covered the 132-square-meter area of the proposed CDC. U.S. Geological Survey National Elevation Data were used in conjunction with the AERMAP pre-processor (Version 09040) to determine receptor elevations. Flagpole receptors (that is, receptors located above ground-level) 4 feet above ground were used to represent the potential breathing zone. The maximum modeled annual concentration at any receptor on this grid was used for the risk calculations.

An air emission inventory for Building 1130 for years 2006 through 2009 was obtained from Tinker AFB. All reported emissions were assumed to be included in the exhaust from the paint booth stacks, emission points 3736A and 3736B. The modeled parameters for the two identical stacks are presented in the following table.

PAINT BOOTH STACK PARAMETERS

Parameter	Modeled Value
Stack Height	35 feet
Stack Diameter	3 feet
Exhaust Temperature	75 °F
Flow Rate	16,900 acfm
Exhaust Velocity	39.848 meters/second

°F = degree Fahrenheit
acfm = actual cubic feet per minute

Because the only emission sources were two identical stacks, the model was run with a unit emission rate. Model results from a unit emission rate from identical stacks have a linear relationship to the actual emission values. Each stack was assumed to have 1 gram per second (g/s) of emissions. The model results are a maximum annual concentration of 57.98 micrograms per cubic meter ($\mu g/m^3$), which should be considered to be 57.98 $\mu g/m^3$ per 2 g/s of emissions. Therefore, to determine the maximum annual concentration for each pollutant, the model result was multiplied by the total emissions for that constituent in the emissions inventory, and divided by 2. These calculation results are included in Attachment 1, Table 3.

Once the air concentrations were calculated for each constituent, the highest maximum annual concentration from 2006 to 2009 was selected for use in the risk evaluation; the constituent air concentrations are presented in Attachment 1, Table 3. Concentrations for the constituents were assumed to be the same for both outside (ambient) and indoor air since outdoor air is known to infiltrate or exchange with the indoor air (for example, refer to discussion of indoor-to-outdoor air exchange [USEPA, 2002]).

Inhalation ECs are the air concentrations to which a receptor is exposed for the assumed exposure duration. The equation for estimating the ECs is provided in Attachment 1, Table 4. The EC equation requires exposure parameters that are specific to each receptor. The exposure parameters often have default values, which are used for risk assessments. The assumed exposure parameters and associated references for the receptors evaluated in this HHRA are provided in Attachment 1, Table 4.

Toxicity Assessment

The primary source of toxicity values is the USEPA's Integrated Risk Information System (IRIS) database (USEPA, 2010). Non-cancer inhalation reference concentrations (RfCs) and inhalation cancer unit risk factors (IURs) that have been verified by USEPA workgroups are provided in IRIS. In accordance with USEPA guidance (USEPA, 2003b), the second tier of toxicity factors that can be used in a risk assessment includes the Provisional Peer Reviewed Toxicity Value (PPRTV) database maintained by the USEPA's National Center for Environmental Assessment and the Superfund Health Risk Technical Support Center. Inhalation toxicity values from the PPRTV were used if values were not available from IRIS. Consistent with USEPA guidance (USEPA, 2003b), USEPA Health Effects Assessment Summary Tables (USEPA, 1997) and the California USEPA toxicological database were also consulted when data were not available in IRIS or PPRTV.

Constituents with available inhalation RfCs and IURs are presented in Attachment 1, Table 5. Constituents that do not have available toxicity values were not evaluated quantitatively in the HHRA and are discussed as an uncertainty in the risk characterization section.

For chromium, the associated toxic effects are dependent upon its valence state (USEPA, 1998). Two common forms of chromium are trivalent chromium (chromium III) and hexavalent chromium (chromium VI). Chromium III is the predominant form of chromium in nature and is the less toxic of the two forms. Hexavalent chromium is the more toxic form of chromium and is considered to be a Class A carcinogen via the route of inhalation. The

speciation of hexavalent chromium (Cr VI) is not routinely performed due to the very short holding time and the unique stability issues associated with hexavalent chromium (that is, it tends to change valence states very easily after sample collection). Unless there is convincing evidence that hexavalent chromium may be present (such as its use for control of scale in non-contact cooling water piping for a power plant or a chromium plating operation), it is generally not included in an analytical program. For Building 1130, hexavalent chromium analyses have not been performed. Some information (for example, material safety data sheets for the coatings applied to vehicles) indicates that hexavalent chromium is present in the coatings used at Building 1130. However, it is not know if the chromium content in all the coatings is in the hexavalent form. For conservatism, the chromium emissions were assumed to be in the form of hexavalent chromium.

Inhalation toxicity data are not available for lead. The potential risks or hazards associated with childhood exposures to lead are typically assessed using USEPA's Integrated Exposure Uptake Biokinetic (IEUBK) Lead Model (USEPA, 1994a). However, modeling of lead exposure was not performed because the maximum annual lead concentration of 0.00052 μ/m^3 (Attachment 1, Table 3) is orders of magnitude less than the default background ambient air lead concentration (0.1 μ/m^3) used in the IEUBK model. Therefore, the impact of lead is expected to be insignificant relative to the background ambient concentration listed in the IEUBK model and was not evaluated further in the risk evaluation (USEPA, 1994b).

Risk Characterization

Risk characterization involves estimating the magnitude of potential cancer risks and/or non-cancer hazards associated with exposure to the chemicals of potential concern. This step of the HHRA combines the estimated exposure levels and inhalation toxicity values to provide numerical estimates of potential risks and non-cancer hazards. Risk characterization also considers the nature and weight of evidence supporting these estimates and the magnitude of uncertainty surrounding the estimates. Potential human health risks are discussed independently for carcinogenic and non-carcinogenic constituents because of the different toxicological endpoints, relevant exposure duration, and methods used to characterize risks and hazards. Exposure to some constituents may result in both non-carcinogenic and carcinogenic effects (for example, ethylbenzene and naphthalene), and therefore these constituents were evaluated in both groups.

Non-cancer hazards are estimated by comparing the calculated exposure concentrations to RfCs. The calculated exposure concentration divided by the RfC is equal to the non-cancer hazard quotient (HQ):

$$HQ = \text{Exposure Concentration} / RfC$$

An HQ that exceeds 1.0 (that is, exposure concentration exceeds the RfC) indicates that there is a potential for non-cancer health effects. Non-cancer HQs are summed to assess the potential for cumulative effects associated with exposure to multiple constituents (USEPA, 1986). This assumes that non-carcinogenic hazards associated with exposure to more than one constituent are additive (hazard index [HI] = sum of the HQs). The USEPA non-cancer cumulative HI target level is one (USEPA, 1990; 1991).

The potential for carcinogenic effects due to exposure to site-related constituents is evaluated by estimating the excess lifetime carcinogenic risk (ELCR). ELCR is the incremental increase in the probability of developing cancer during a lifetime.

Carcinogenic risk is calculated by multiplying the exposure concentration by the IUR:

$$ELCR = Intake \times IUR$$

The combined risk from exposure to multiple constituents was evaluated by adding the risks from individual constituents. USEPA's target range for carcinogenic risk associated with CERCLA sites is 1 in 10,000 (1×10^{-4}) to 1 in 1 million (1×10^{-6}) (USEPA, 1990; 1991).

Risk Assessment Results

Attachment 1, Tables 6 and 7, present the risk calculations for each of the receptors and exposure scenarios evaluated in the risk assessment. A summary is provided in the following table.

SUMMARY OF RISK AND HAZARD ESTIMATES

Receptor	Cancer Risk Estimate	Hazard Estimate
CDC Worker	3×10^{-7}	0.1
CDC Child	7×10^{-8}	0.1

The HHRA assumed that a future CDC worker could be exposed to volatile and fugitive dust emissions generated from operations at Building 1130 through inhalation. The non-cancer HI of 0.1 is less than the ODEQ and USEPA target HI of one. The estimated cancer risk of 3×10^{-7} is less than the ODEQ target level of 1×10^{-5} and also less than the USEPA target risk range of 1×10^{-6} to 1×10^{-4}. (ODEQ, 2004; USEPA, 1990; 1991)

The HHRA assumed that a future CDC child could be exposed to volatile and fugitive dust emissions generated from operations at Building 1130 through inhalation. The non-cancer HI of 0.1 is less than less than the ODEQ and USEPA target HI of one. The estimated cancer risk of 7×10^{-8} is less than the ODEQ target level of 1×10^{-5} and also less than the USEPA target risk range of 1×10^{-6} to 1×10^{-4}. (ODEQ, 2004; USEPA, 1990; 1991)

Examples of uncertainties beyond the speciation of chromium include selection of the exposure point concentrations and the lack of inhalation toxicity data. As discussed previously, the exposure point concentrations used in the HHRA were based on the maximum modeled annual air concentration for emissions from 2006 through 2009. The actual long-term exposure point concentrations and associated risks or hazards are likely less. In addition, modeled concentrations were based on the assumption that work remains constant over time, were based on a reasonable worst-case assumption, and did not take into account variability in workload operations at the motor pool facility from year to year. Actual risks or hazards are likely less than predicted based on the reasonable worst-case operational assumptions.

A number of the constituents listed in the emissions inventory (see Attachment 1, Table 1) for Building 1130 do not have available inhalation toxicity data and risks or hazards cannot

be quantified. Although this could lead to underestimating potential risks or hazards, this likely only prevents a minimal uncertainty since the general chemical categories (for example, ketones, acetates, alcohols, and gluterates) are not generally significant risk drivers due to their relative toxicity compared with the constituents considered in this HHRA. For example, refer to the risk or hazard estimates for the ketones and alcohols (for example, methyl ethyl ketone, methyl isobutyl ketone, isopropanol, and methanol) that were evaluated in the risk evaluation (Attachment 1, Tables 6 and 7).

Conclusions

This HHRA was conducted to estimate the human health risks and hazards associated with potential exposure of future CDC workers and children to air emissions released from Building 1130. The estimated risks and hazards were less than ODEQ target levels and were less than USEPA target levels (ODEQ, 2004; USEPA, 1990; 1991).

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U.S. Environmental Protection Agency (USEPA), 2010. Integrated Risk Information System (IRIS) Database. http://cfpub.epa.gov/ncea/iris/index.cfm.

Figures

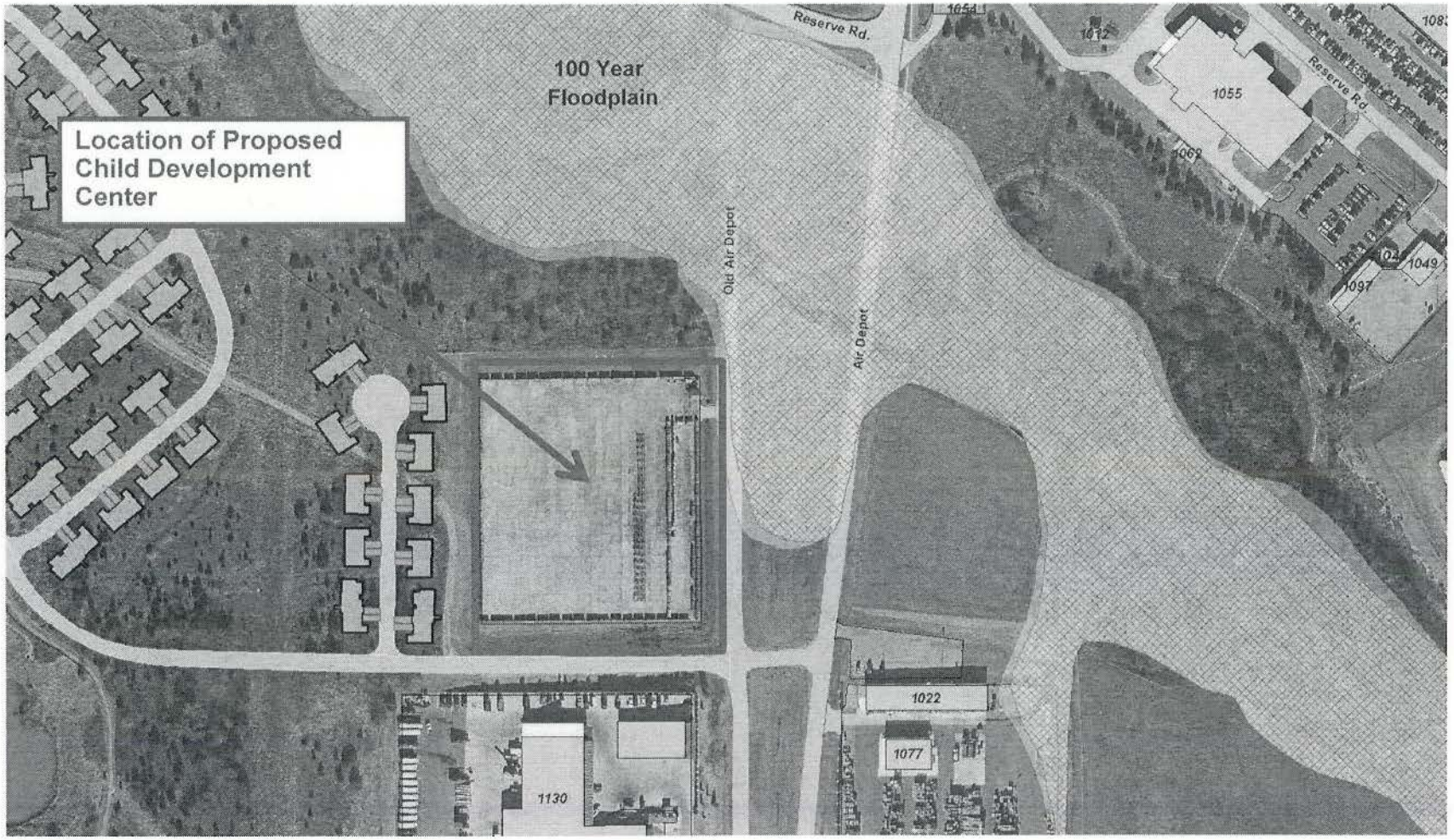
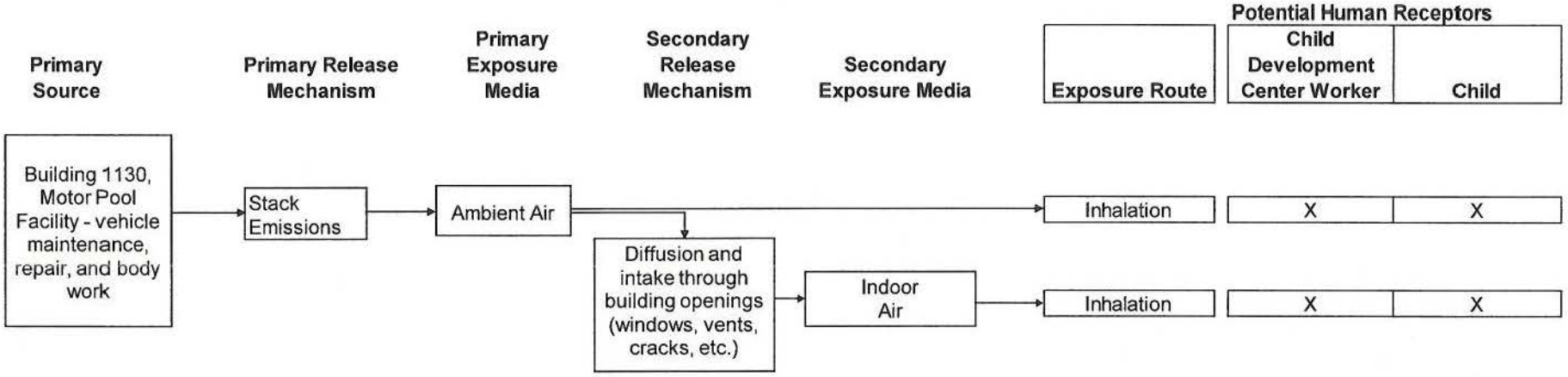


FIGURE 1
Proposed Location of Child Development Center
Human Health Risk Assessment -
Proposed Child Development Center
Tinker Air Force Base, Oklahoma



LEGEND

X - Potentially complete exposure pathways

FIGURE 2
Conceptual Site Model
Human Health Risk Assessment -
Proposed Child Development Center
Tinker Air Force Base, Oklahoma

Attachment 1

TABLE 1
Constituents from Emissions Inventory List for Building 1130 1
Human Health Risk Assessment - Proposed Child Development Center
Tinker Air Force Base, Oklahoma

CAS No	Constituent
95-63-6	1,2,4-Trimethylbenzene
108-67-8	1,3,5-Trimethylbenzene
822-06-0	1,6-Diisocyanatohexane (Hexamethylene Diisocyanate)
71-36-3	1-Butanol
108-65-6	1-Methoxy-2-Propanol Acetate (Propylene glycol methyl ether acetate)
111-76-2	2-Butoxy ethanol
112-07-2	2-Butoxyethyl acetate
78-83-1	2-Methyl-1-propanol (Isobutyl alcohol)
107-87-9	2-Pentanone (Methyl n-Propyl Ketone)
67-64-1	Acetone
64742-89-8	Aliphatic Light Solvent Naptha
98-56-6	Benzene-1-chloro-4(trifluoromethyl) (p-Chlorobenzotrifluoride)
123-86-4	Butyl acetate
1333-86-4	Carbon black
7440-47-3	Chromium[1]
1308-38-9	Chromium Oxide
68187-49-5	Cobalt Chromite Green Spinel
14464-46-1	Cristobalite
1119-40-0	Dimethyl glutarate
763-69-9	Ethyl 3-Ethoxypropionate (Ethyl-b-ethoxy propionate)
141-78-6	Ethyl acetate
100-41-4	Ethylbenzene
28182-81-2	Hexamethylene diisocyanate polymer
108419-32-5	Isooctyl Acetate
4098-71-9	Isophorone Diisocyanate Polymer
67-63-0	Isopropanol
7439-92-1	Lead
64742-89-8	Light Aliphatic Hydrocarbons
64742-95-6	Light Aromatic Hydrocarbons
64742-94-5	Medium Aromatic Hydrocarbons
64742-88-7	Medium Mineral Spirits
67-56-1	Methanol
78-93-3	Methyl ethyl ketone
108-10-1	Methyl isobutyl ketone
110-43-0	Methyl N-amyl ketone
91-20-3	Naphthalene
1338-24-5	Naphthenic acids
14808-60-7	Quartz
14807-96-6	Talc
13463-67-7	Titanium Dioxide
108-88-3	Toluene
1330-20-7	Xylenes (mixed isomers)

Notes:
Source: Information provided by Tinker AFB.
[1] Information on the speciation of chromium is not available. For the risk assessment, it was conservatively assumed that chromium is in the form of hexavalent chromium.

TABLE 2

Selection of Exposure Pathways

Human Health Risk Assessment - Proposed Child Development Center

Tinker Air Force Base, Oklahoma

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection of Exposure Pathway
Future	Ambient Air	Ambient Air	Child Development Center - Outside Play Area[1]	CDC Worker	Adult	Inhalation	Quant	Workers may inhale vapors and particulate dust while working outside at the proposed Child Development Center.
				Child	Child	Inhalation	Quant	Children may inhale vapors and particulate dust while playing outside at the proposed Child Development Center.
		Indoor Air	Child Development Center - Indoors[1]	CDC Worker	Adult	Inhalation	Quant	CDC workers may inhale vapors or particulates that have intruded into the building from the outdoors.
				Child	Child	Inhalation	Quant	Children may inhale vapors or particulates that have intruded into the building from the outdoors.

Notes:

[1] It was conservatively assumed that indoor air concentrations are equal to outside ambient air concentrations.

CDC - Child Development Center

Type of Analysis:

Quant - Quantitative analysis

TABLE 3

Maximum Modeled Annual Concentrations for 2006 to 2009

Human Health Risk Assessment - Proposed Child Development Center

Tinker Air Force Base, Oklahoma

Constituent[1]	Yearly Maximum Annual Concentration ($\mu g/m^3$)[2]				Exposure Point Concentration[3]
	2006	2007	2008	2009	
1,2,4-Trimethylbenzene	2.75E-02	1.42E-02	8.34E-03	1.58E-02	2.75E-02
1,3,5-Trimethylbenzene	4.17E-03	2.50E-03	1.67E-03	3.75E-03	4.17E-03
1,6-Diisocyanatohexane	5.00E-03	NA	2.50E-03	5.84E-03	5.84E-03
2-Butoxy ethanol	8.51E-02	1.67E-03	8.34E-04	1.25E-03	8.51E-02
Acetone	9.51E-02	NA	5.84E-03	1.63E-02	9.51E-02
Benzene-1-chloro-4(trifluoromethyl)	2.50E-03	NA	1.67E-03	4.59E-03	4.59E-03
Chromium[4,5]	NA	1.81E-06	NA	3.62E-05	3.62E-05
Cristobalite[5]	NA	NA	NA	1.09E-05	1.09E-05
Ethylbenzene	1.37E-01	2.75E-02	1.82E-01	3.09E-02	1.82E-01
Isopropanol	8.34E-02	2.11E-02	4.13E-04	NA	8.34E-02
Lead[5]	NA	1.81E-06	NA	3.62E-06	3.62E-06
Methanol	8.34E-02	NA	NA	NA	8.34E-02
Methyl ethyl ketone	8.34E-03	1.41E-02	1.71E-01	6.25E-03	1.71E-01
Methyl isobutyl ketone	8.42E-02	NA	NA	6.67E-03	8.42E-02
Naphthalene	NA	NA	NA	3.34E-03	3.34E-03
Quartz[5]	NA	NA	NA	1.09E-04	1.09E-04
Toluene	1.18E-01	2.34E-02	1.78E-01	2.34E-02	1.78E-01
Xylenes (mixed isomers)	1.33E-01	2.75E-02	1.80E-01	2.71E-02	1.80E-01

Notes:

NA - Not available (i.e., no emissions data reported).

[1] Annual concentrations were only modeled for constituents quantitatively evaluated in the risk assessment (i.e., those constituents with available

[2] Yearly maximum modeled annual concentrations were based on tons/year emissions.

[3] Exposure point concentration used in the risk calculations is the maximum yearly modeled concentration from 2006 to 2009.

[4] Information on the speciation of chromium is not available. For the risk assessment, it was conservatively assumed that chromium is in the form of hexavalent chromium.

[5] Non-volatile organic compound emissions (VOC) were reduced by 65% to account for coating transfer efficiency of paint guns, followed by an 93.8% reduction to account for filter (3-stage) efficiency. There are no VOC controls in the paint booths.

TABLE 4

Values Used For Exposure Concentration Calculations

Human Health Risk Assessment - Proposed Child Development Center

Tinker Air Force Base, Oklahoma

Scenario Timeframe: Future

Medium: Air

Exposure Medium: Ambient Air/Indoor Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Exposure Concentration Equation/Model Name
Inhalation	CDC Worker	Adult	Ambient Air/Indoor Air	CA	Chemical Concentration in Air	Calculated	$\mu g/m^3$	Calculated[1]	Exposure Concentration (µg/m3) =
				EF	Exposure Frequency	250	days/year	EPA, 2002	CA x ET x ED x EF x CF1 x 1/AT
				ED	Exposure Duration	25	years	EPA, 2002	
				ET	Exposure Time	8	hr/day	[2]	
				CF1	Conversion Factor 1	1/24	day/hour	- -	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989[3]	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	EPA, 1989[4]	
	Child	Child	Ambient Air/Indoor Air	CA	Chemical Concentration in Air	Calculated	$\mu g/m^3$	Calculated	Exposure Concentration (µg/m3) =
				EF	Exposure Frequency	250	days/year	[5]	CA x ET x ED x EF x CF1 x 1/AT
				ED	Exposure Duration	6	years	[6]	
				ET	Exposure Time	8	hr/day	[5]	
				CF1	Conversion Factor 1	1/24	day/hour	- -	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989[3]	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	EPA, 1989[4]	

Notes:

[1]The constituent concentrations in air were calculated for volatile and fugitive dust emissions using EPA's AERMOD dispersion modeling system.

[2]Professional judgment based on an assumed 8-hour work day.

[3]Calculated as the product of ED (years) x 365 days/year.

[4]Calculated as the product of 70 years assumed human lifetime (EPA, 1989a) x 365 days/year.

[5]Professional judgment assuming Exposure Frequency and Exposure Time are the same as that for Commercial Worker.

[6]Professional judgment assuming child could spend up to 6 years at the Child Development Center.

CDC - Child Development Center

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund, Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24, December, 2002.

TABLE 5

Non-Cancer and Cancer Toxicity Data – Inhalation

Human Health Risk Assessment - Proposed Child Development Center

Tinker Air Force Base, Oklahoma

Chemical of Potential Concern	Inhalation RfC		RfC : Target Organ(s)		Inhalation Unit Risk		Unit Risk : Inhalation CSF	
	Value	Units	Source(s)	Date(s) (MM/DD/YYYY)	Value	Units	Source(s)	Date(s) (MM/DD/YYYY)
1,2,4-Trimethylbenzene	7.0E-03	mg/m^3	PPRTV	6/11/2007	NA	NA	NA	NA
1,3,5-Trimethylbenzene	7.0E-03	mg/m^3	PPRTV	6/11/2007	NA	NA	NA	NA
1,6-Diisocyanatohexane	1.0E-05	mg/m^3	IRIS	1/12/2010	NA	NA	NA	NA
2-Butoxy ethanol	1.3E+01	mg/m^3	IRIS	1/12/2010	NA	NA	NA	NA
Acetone	3.1E+01	mg/m^3	ATSDR MRL	12/2008	NA	NA	NA	NA
4(trifluoromethyl)	3.0E-01	mg/m^3	PPRTV (RSL)	12/22/2009	NA	NA	NA	NA
Chromium	1.0E-04	mg/m^3	IRIS	1/12/2010	8.4E-02	$(ug/m^3)^{-1}$	IRIS (RSL)	12/22/2009
Cristobalite	3.0E-03	mg/m^3	Cal EPA	1/12/2010	NA	NA	NA	NA
Ethylbenzene	1.0E+00	mg/m^3	IRIS	1/12/2010	2.5E-06	$(ug/m^3)^{-1}$	Cal EPA	1/12/2010
Isopropanol	7.0E+00	mg/m^3	Cal EPA (RSL)	12/22/2009	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	4.0E+00	mg/m^3	Cal EPA	1/12/2010	NA	NA	NA	NA
Methyl ethyl ketone	5.0E+00	mg/m^3	IRIS	1/12/2010	NA	NA	NA	NA
Methyl isobutyl ketone	3.0E+00	mg/m^3	IRIS	1/12/2010	NA	NA	NA	NA
Naphthalene	3.0E-03	mg/m^3	IRIS	1/12/2010	3.4E-05	$(ug/m^3)^{-1}$	Cal EPA	1/12/2010
Quartz	3.0E-03	mg/m^3	Cal EPA	1/12/2010	NA	NA	NA	NA
Toluene	5.0E+00	mg/m^3	IRIS	1/12/2010	NA	NA	NA	NA
Xylenes (mixed isomers)	1.0E-01	mg/m^3	IRIS	1/12/2010	NA	NA	NA	NA

Notes:

Definitions:

NA = Not Available

ATSDR MRL = Agency for Toxic Substances & Disease Registry Minimal Risk Levels

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables

PPRTV = Provisional Peer-Reviewed Toxicity Value

Cal/EPA = California Environmental Protection Agency

RSL = As cited in EPA Regional Screening Level Table

Chromium VI toxicity values were used to represent chromium.

Silica (crystalline, respirable) toxicity values were used to represent Cristobalite and Quartz.

1,2,4-Trimethylbenzene toxicity values were used to represent 1,3,5-trimethylbenzene.

Chlorobenzotrifluoride, 4- toxicity values were used to represent Benzene-1-chloro-4(trifluoromethyl).

1,6-Hexamethylene diisocyanate toxicity values were used to represent 1,6-Diisocyanatohexane.

TABLE 6

Calculation of Chemical Cancer Risks and Non-Cancer Hazards

Human Health Risk Assessment - Proposed Child Development Center

Tinker Air Force Base, Oklahoma

Scenario Timeframe: Future
Receptor Population: CDC Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Air	Air	Ambient Air/ Indoor Air	Inhalation	1,2,4-Trimethylbenzene	2.8E-02	µg/m^3	2.2E-03	µg/m^3	NA	NA	NA	6.3E-06	mg/m^3	7.0E-03	mg/m^3	9.0E-04
				1,3,5-Trimethylbenzene	4.2E-03	µg/m^3	3.4E-04	µg/m^3	NA	NA	NA	9.5E-07	mg/m^3	7.0E-03	mg/m^3	1.4E-04
				1,6-Diisocyanatohexane	5.8E-03	µg/m^3	4.8E-04	µg/m^3	NA	NA	NA	1.3E-06	mg/m^3	1.0E-05	mg/m^3	1.3E-01
				2-Butoxy ethanol	8.5E-02	µg/m^3	6.9E-03	µg/m^3	NA	NA	NA	1.9E-05	mg/m^3	1.3E+01	mg/m^3	1.5E-06
				Acetone	9.5E-02	µg/m^3	7.8E-03	µg/m^3	NA	NA	NA	2.2E-05	mg/m^3	3.1E+01	mg/m^3	7.0E-07
				Benzene-1-chloro-4(trifluoromethyl)	4.6E-03	µg/m^3	3.7E-04	µg/m^3	NA	NA	NA	1.0E-06	mg/m^3	3.0E-01	mg/m^3	3.5E-06
				Chromium[1]	3.6E-05	µg/m^3	3.0E-06	µg/m^3	8.4E-02	(µg/m^3)$^{-1}$	2.5E-07	8.3E-09	mg/m^3	1.0E-04	mg/m^3	8.3E-05
				Cristobalite	1.1E-05	µg/m^3	8.9E-07	µg/m^3	NA	NA	NA	2.5E-09	mg/m^3	3.0E-03	mg/m^3	8.3E-07
				Ethylbenzene	1.8E-01	µg/m^3	1.5E-02	µg/m^3	2.5E-06	(µg/m^3)$^{-1}$	3.7E-08	4.2E-05	mg/m^3	1.0E+00	mg/m^3	4.2E-05
				Isopropanol	8.3E-02	µg/m^3	6.8E-03	µg/m^3	NA	NA	NA	1.9E-05	mg/m^3	7.0E+00	mg/m^3	2.7E-06
				Methanol	8.3E-02	µg/m^3	6.8E-03	µg/m^3	NA	NA	NA	1.9E-05	mg/m^3	4.0E+00	mg/m^3	4.8E-06
				Methyl ethyl ketone	1.7E-01	µg/m^3	1.4E-02	µg/m^3	NA	NA	NA	3.9E-05	mg/m^3	5.0E+00	mg/m^3	7.8E-06
				Methyl isobutyl ketone	8.4E-02	µg/m^3	6.9E-03	µg/m^3	NA	NA	NA	1.9E-05	mg/m^3	3.0E+00	mg/m^3	6.4E-06
				Naphthalene	3.3E-03	µg/m^3	2.7E-04	µg/m^3	3.4E-05	(µg/m^3)$^{-1}$	9.2E-09	7.6E-07	mg/m^3	3.0E-03	mg/m^3	2.5E-04
				Quartz	1.1E-04	µg/m^3	8.9E-06	µg/m^3	NA	NA	NA	2.5E-08	mg/m^3	3.0E-03	mg/m^3	8.3E-06
				Toluene	1.8E-01	µg/m^3	1.5E-02	µg/m^3	NA	NA	NA	4.1E-05	mg/m^3	5.0E+00	mg/m^3	8.1E-06
				Xylenes (mixed isomers)	1.8E-01	µg/m^3	1.5E-02	µg/m^3	NA	NA	NA	4.1E-05	mg/m^3	1.0E-01	mg/m^3	4.1E-04
			Exp. Route Total								2.9E-07					1.4E-01
		Exposure Point Total									2.9E-07					1.4E-01
	Exposure Medium Total										2.9E-07					1.4E-01
Air Total											2.9E-07					1.4E-01

Notes:

CDC - Child Development Center

N/A - Not available.

[1]Information on the speciation of chromium is not available. For the risk assessment, it was conservatively assumed that chromium is in the form of hexavalent chromium.

TABLE 7
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Human Health Risk Assessment - Proposed Child Development Center
Tinker Air Force Base, Oklahoma

Scenario Timeframe: Future
Receptor Population: Child
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Air	Air	Ambient Air/ Indoor Air	Inhalation	1,2,4-Trimethylbenzene	2.8E-02	µg/m³	5.4E-04	µg/m³	NA	NA	NA	6.3E-06	mg/m³	7.0E-03	mg/m³	9.0E-04
				1,3,5-Trimethylbenzene	4.2E-03	µg/m³	8.2E-05	µg/m³	NA	NA	NA	9.5E-07	mg/m³	7.0E-03	mg/m³	1.4E-04
				1,6-Diisocyanatohexane	5.8E-03	µg/m³	1.1E-04	µg/m³	NA	NA	NA	1.3E-06	mg/m³	1.0E-05	mg/m³	1.3E-01
				2-Butoxy ethanol	8.5E-02	µg/m³	1.7E-03	µg/m³	NA	NA	NA	1.9E-05	mg/m³	1.3E+01	mg/m³	1.5E-06
				Acetone	9.5E-02	µg/m³	1.9E-03	µg/m³	NA	NA	NA	2.2E-05	mg/m³	3.1E+01	mg/m³	7.0E-07
				Benzene-1-chloro-4(trifluoromethyl)	4.6E-03	µg/m³	9.0E-05	µg/m³	NA	NA	NA	1.0E-06	mg/m³	3.0E-01	mg/m³	3.5E-06
				Chromium[1]	3.6E-05	µg/m³	7.1E-07	µg/m³	8.4E-02	$(\mu g/m^3)^{-1}$	5.9E-08	8.3E-09	mg/m³	1.0E-04	mg/m³	8.3E-05
				Cristobalite	1.1E-05	µg/m³	2.1E-07	µg/m³	NA	NA	NA	2.5E-09	mg/m³	3.0E-03	mg/m³	8.3E-07
				Ethylbenzene	1.8E-01	µg/m³	3.6E-03	µg/m³	2.5E-06	$(\mu g/m^3)^{-1}$	8.9E-09	4.2E-05	mg/m³	1.0E+00	mg/m³	4.2E-05
				Isopropanol	8.3E-02	µg/m³	1.6E-03	µg/m³	NA	NA	NA	1.9E-05	mg/m³	7.0E+00	mg/m³	2.7E-06
				Methanol	8.3E-02	µg/m³	1.6E-03	µg/m³	NA	NA	NA	1.9E-05	mg/m³	4.0E+00	mg/m³	4.8E-06
				Methyl ethyl ketone	1.7E-01	µg/m³	3.3E-03	µg/m³	NA	NA	NA	3.9E-05	mg/m³	5.0E+00	mg/m³	7.8E-06
				Methyl isobutyl ketone	8.4E-02	µg/m³	1.6E-03	µg/m³	NA	NA	NA	1.9E-05	mg/m³	3.0E+00	mg/m³	6.4E-06
				Naphthalene	3.3E-03	µg/m³	6.5E-05	µg/m³	3.4E-05	$(\mu g/m^3)^{-1}$	2.2E-09	7.6E-07	mg/m³	3.0E-03	mg/m³	2.5E-04
				Quartz	1.1E-04	µg/m³	2.1E-06	µg/m³	NA	NA	NA	2.5E-08	mg/m³	3.0E-03	mg/m³	8.3E-06
				Toluene	1.8E-01	µg/m³	3.5E-03	µg/m³	NA	NA	NA	4.1E-05	mg/m³	5.0E+00	mg/m³	8.1E-06
				Xylenes (mixed isomers)	1.8E-01	µg/m³	3.5E-03	µg/m³	NA	NA	NA	4.1E-05	mg/m³	1.0E-01	mg/m³	4.1E-04
			Exp. Route Total								7.1E-08					1.4E-01
		Exposure Point Total									7.1E-08					1.4E-01
	Exposure Medium Total										7.1E-08					1.4E-01
Air Total											7.1E-08					1.4E-01

Notes:
N/A - Not available.
[1]Information on the speciation of chromium is not available. For the risk assessment, it was conservatively assumed that chromium is in the form of hexavalent chromium.

Attachment 2

CH2M HILL
402 West Broadway
San Diego, CA 92124
Tel 619.687.0120 x37216
Fax 619.687.0111

CH2MHILL

October 22, 2009

Marcia Banks
San Diego Air Pollution Control District
10124 Old Grove Road
San Diego, CA 92131

Subject: 2006 Emission Inventory for ROHR INC (Facility ID: 301A)

Dear Ms. Banks,

This letter addresses two issues for the ROHR INC facility (ID 301A), 2006 Emission Inventory:

1) The estimated toxic emission associated the facility paint booths
2) The estimated toxic emissions associated with the facility cogenerations engines

The purpose of this letter is to request a review of the toxic emission calculations used for the paint spray booths and cogeneration units.

Paint Spray Booths

Fall Out Fraction

The Fall Out Fraction Emissions Estimation Technique (FOFEET) was a demonstration test performed on May 25, 1995 at the ROHR INC facility under the supervision of the SDAPCD, the South Coast Air Quality Management District, California Air Resources Board and the US Environmental Protection Agency (EPA). The FOFEET test demonstrated that on average 90.98% of the paint material falls out prior to challenging the filter. The FOFEET report detailing the methodology and results of the demonstration is included in Addendum A. We would like to verify that the 2006 paint booth emissions account for the portion of paint that falls out prior to challenging the filters.

Capture Efficiency

The paint booths included in the 2006 emissions inventory along with the capture efficiency assumed in the 2006 emissions inventory are listed in Table 1. On May 1, 2008 Dave Byrnes approved the use of 100% capture efficiency of overspray for paint booths used at ROHR. This approval and associated letter are included in Addendum B.

TABLE 1
Paint Booth Capture Efficiency

Paint Booth ID	Permit Number	SDAPCD Assumed Capture Efficiency (%)	Approved Capture Efficiency (%)
PB 1-9	1629	90	100
PB 1-10	1630	90	100
PB 1-11	2150	90	100
PB 1-12	890496	100	100
PB 1-13	2640	90	100
PB 1-8	41089	90	100
PB 1-7	860680	100	100
PB 1-14	41090	90	100
PB 1-15	1631	90	100
PB 1-18	890495	90	100

Control Efficiency

The 2006 emission inventory used the paint booth filter system (i.e. Certified Under US EPAs Environmental Technology Verification - ETV ATI OSM 200 - Addendum C) control efficiency of 99.0%. Based on the manufactures data provided by Paint Pockets the filter efficiency for HVLP paint spray gun used at the ROHR facility is 99.9% control.

Testing to determine the size distribution of chromate paint aerosol was done using a HVLP paint spray guns similar to those and under the same conditions as those used at the ROHR facility. Test data indicates that the mass consisted primarily of particles greater than 10 microns. The complete size distribution analysis and report are included in Addendum D.

The Paint Pocket filters are used in both the assembly and detail paint shops. As shown by the Paint Pocket manufactures guarantee included in Addendum E, the control efficiency for particles greater than 10 microns is 99.9%. Therefore, the emissions associated with the paint booths listed in Table 1 should be calculated using a control efficiency of 99.9% rather than 99.0%.

Paint Booth Summary

It is requested that the paint booth emissions included in the 2006 ROHR emission inventory be reviewed with respect to the data presented in this memorandum. Specifically, that the emissions account for: 1) the 90.98% of material that falls out prior to challenging the filter; 2) the previously approved 100% capture efficiency for the paint booths; and 3) the manufacture guaranteed filter control efficiency of 99.9%. An example calculation of the proposed calculation is included below:

Quantity of Material Used (Gal) x (% Toxic by Weight) x (1- Fall Out Fraction) x Capture Efficiency x (1 - Control Efficiency) = Toxic Pollutant Emissions

Quantity of Material Used (Gal) x (% Toxic by Weight) x (1- 90.98%) x 100% x (1- 99.9%) = Toxic Pollutant Emissions

Cogeneration Units

The three cogeneration units operating at the ROHR INC facility are Fairbanks Morse Model 38ETDD8 - 1/6, 4410 HP, 2-Cycle, Lean Burn Engines. The emissions from each engine are controlled with a selective catalytic reduction (SCR) and an oxidation catalyst (OC).

Annually, a performance test demonstrates the control equipment reduces NOx emissions by at least 90-percent, as required by the facility permits to operate, 977273, 977274, and 977275.

During the initial start-up of the cogeneration units the annual performance test included measurement of formaldehyde and acrolein emissions post control equipment. The emission factors determined for these two pollutants during the performance test are used in the 2006 emissions inventory. The emission factors for the other toxic pollutants listed in the 2006 emission inventory are based on the US EPA AP 42 emission factors for an uncontrolled 2-stroke lean burn engine.

As shown in Table 2, the emission factors determined from the source test demonstrate between a 78 - 91 percent reduction relative to the US EPA emission factors. This is not surprising since the US EPA AP 42 emission factors do not account for any control equipment. According to the Manufactures of Emission Controls Association, by themselves catalytic oxidizers typically control about 90 percent of hydrocarbons, carbon monoxide, and toxic emissions such as benzene, formaldehyde, acetaldehyde, methanol and other HAP from lean burn engines (Included in Addendum F).

TABLE 2
Cogeneration Emission Factors

Pollutant	AP 42 EF (lb/MMBtu)	Source Test Derived and SDAPCD Approved EF (lb/MMBtu)	Percent Reduction (Source Test vs. AP 42 EF)
Formaldehyde	5.52 E-02	5.24 E-03	91%
Acrolein	7.78E-03	1.75E-03	78%

1. AP42 Emission factors are non-controlled emission factors from AP 42 Section 3.2 and as used in the 2006 ROHR emission inventory.

Cogeneration Unit Summary

It is recommended that the toxic emissions associated with the cogeneration units incorporate at least a 78 percent control efficiency to the emission calculation using the default US EPA non-controlled emission factors.

If there are any questions or if you would like to discuss this in person please contact me or my associate Andrea White.

Sincerely,

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